REPORT

ON THE

HORTICULTURAL GARDEN OF LUCKNOW

FOR THE

YEAR ENDING 31ST MARCH, 1879.

No. OF 1879.

FROM

THE DIRECTOR, DEPT. OF AGRICULTURE AND COMMERCE,

NORTH-WESTERN PROVINCES AND OUDH,

To

THE SECRETARY TO THE GOVERNMENT,

NORTH-WESTERN PROVINCES AND OUDH.

DATED CAWNPORE, THE NOVEMBER, 1879.

SIR,

I HAVE the honor to submit the annual report on the Lucknow horticultural gardens.

This is the first report which I have been personally called upon to submit, that of last year, when the gardens were for the first time brought under this Department, having been sent up by Mr. Wright, who officiated for me. I will, therefore, range in order the different public objects which I conceive it to be the function of the gardens to carry out, an order which should be maintained in future reports.

2. The main heads, under which the work of the gardens should be distributed, are:— Main heads of work.

I.—Fruit culture.
II.—Vegetable and farm culture.
III.—Flower culture.
IV.—Arboriculture.
V.—Instruction of natives.

Each of the main heads I. to IV. includes a secondary division——

(*a*) Improvement of indigenous or acclimatized kinds ;
(*b*) Introduction of new kinds ;
(*c*) Distribution.

Whatever experiments of an agricultural tendency have been tried will be included under the head of " vegetable," since (the operations of the farm not being agricultural) experiments under that head will be few.

3. The Superintendent is Mr. Ridley, who had the advantage of working for some time under Dr. Bonavia, whose own valuable services were acknowledged by Government in last year's report. Mr. Ridley himself deserves the good opinion of Government for his intelligent management of the gardens, and the painstaking and thorough attention which he has given to every subject which he has been required to take in hand.

4. I will now proceed to review roughly Mr. Ridley's report, under the heads which I have noted in para. 2. If Government desire the practice hitherto adopted to be continued, of printing the Lucknow report *in extenso*, it will be needless for me to recapitulate at any length details given by Mr. Ridley, and I shall confine myself rather to general questions and shall explain how far those principles, which, in my opinion, ought to underlie the operations of the gardens, are being worked out.

1.—FRUIT CULTURE.

I.—FRUIT CULTURE.

(a) Improvement of indigenous or acclimatized kinds.

5. *(a) Improvement of indigenous or acclimatized kinds.*—This is one of the most important objects in view. No scientific attempt at improvement of indigenous fruit trees has yet been undertaken in these provinces.

I have, for the last two or three years, endeavoured to induce such attempts at Allahabad and Cawnpore, but the Superintendent had either not skill or zeal sufficient to make any earnest beginning. I therefore, when Lucknow became available, addressed myself to Mr. Ridley, who has made, what is I hope, a practical commencement.

It may prove impracticable to effect any great improvement in Indian fruits ; but, considering the great strides made in Europe and America in the fruits of those continents by scientific gardeners, it is right that those scientific gardeners who have been brought to this country should make some attempt in the same direction.

6. The indigenous fruits which Mr. Ridley has mentioned, are mangoes and *bers*. He has introduced four new kinds of mangoes, and is making experiments with a view to the establishment of a late-fruiting variety. This last is the kind of improvement I wish him to attempt. He has not placed on record any plans which he may have formed for improvement of the fruit in any other ways, such as improved system of grafting, production of thin-skinned or small-stoned varieties, new methods of treatment, manuring, root-pruning, &c. This should be required in the next year's report, unless he can give sufficient reason to show that no interference with existing methods is desirable. Ber (*Zyzyphus jujuba*) is a fruit I have long considered one which may prove susceptible of improvement, and have often requested that experiments might be tried with it. Mr. Ridley has taken it in hand, and commenced a series of trials, of which an account is given in the appendix.

7. Nothing is said of any other indigenous fruits, but this is an omission. Mr. Ridley has, under my instructions, made some experiments in the treatment of limes, which should have been mentioned. In his next year's report, he should show more fully in what sections of fruit culture he proposes to take action; and, although I am far from advising that he should burden himself at one time with too many experiments, he should, at any rate, set before himself certain definite objects for the accomplishment of which he should make persevering attempts, and with respect to which any progress which he may have made should be explained in each year's report

8. Mr. Ridley has, however, done something towards the improvement of acclimatized fruits. The vines, which have been hitherto in an unsatisfactory condition, have been brought into better order and prepared for experimental process in the following year. I may mention here that the system alluded to, of covering in vines with gauze or muslin, has been practised with some success at Cawnpore for two years. When the grapes are formed, the vinery is then covered with green muslin and filled with pans or reservoirs of water so that a subdued light and a moist atmosphere is obtained, under which conditions fruit swells more satisfactorily and is said to have acquired much better growth and flavour.

I.—Fruit culture.

(a) Improvement of indigenous or acclimatized kinds.

9. Oranges were another fruit that received some attention, but operations were chiefly confined to the trial of pumalloe stocks and the fertilisation of Malta flowers with pollen from kewla blossoms, the results of which are of course not yet known.

(b) Introduction of new kinds.

10. (*b.*) *Introduction of new kinds.*—I shall take the opportunity, under this head, of including some mention of those fruits which have been introduced in former years, and of which the cultivation has been continued in the garden. I cannot say that the list is complete, but in future reports Mr. Ridley should always give a complete list under this head.

Oranges.

11. *Oranges*—

1 Mandarin.
2 Sylhet.
3 Nágpur.
4 Paenbágh.
5 Malta.

These were introduced by Dr. Bonavia; who, after some years, placed them in the above order of merit ; but Mr. Ridley has apparently advanced the Malta to the first position, and it certainly possesses a merit in the fact of its early harvest. Mr. Ridley states that he has no information how it has succeeded in other gardens to which it has been supplied. It will be desirable for him to make enquiries in the present year. He should also state what has become of the Nágpur orange of which Dr. Bonavia spoke very favourably in 1876.

Vines.

12. *Vines.*—Names of varieties are not given. The omission should be rectified next year, and a statement of the most successful given.

Carobs.

13. *Carobs.*—The trees planted some years ago by Dr. Bonavia fruit fairly well, and supply seeds for distribution ; but the pod, ripening as it does in April, is shrivelled and attenuated, and must afford far less nourishment than the Mediterranean fruit. Dr. Bonavia has suggested the procural of plants from Cyprus, a suggestion already carried out by a requisition sent to the Governor of that Island by the Government of India, at the instance of this Department.

Inga dulcis.

14. *Inga dulcis* thrives and fruits well, and is noticed in last year's report as a fruit-producer of much value. A demand for its seed is springing up in the North-Western Provinces.

Mesquit bean.

15. *Mesquit bean.*—Plantations are being formed of the mesquit bean *(prosopis glandulosa)*, another food-producer under introduction into the province. Its value is as yet uncertain.

Arabian date.

16. *Arabian date palms* fruited in 1877, the dry year, and some are fruiting now ; but, as a rule, the climate is far too moist for them, and I doubt the possibility of their succeeding to any profitable extent at Lucknow. Some will be this year transferred to districts of least rainfall in the vicinity of the Jumna, since it is well-established that anything like continuous rainfall is prohibitive of success. With the date palm, our best chance of utilizing the tree is to try it in the dryest districts of the province.

Strawberry.

A comparative trial was made of strawberry plants from Naini Tal, Dinapur and Meerut, three places more or less known to produce fairly

I.—Fruit culture. (b) Introduction of new kinds.

good fruit. Dinapur won, but Naini Tal, which sent newly-imported English kinds, gave some very good specimens, while, to use the words of the Superintendent, Meerut plants were nowhere. Dinapur plants, however, cost Rs. 2-4-0 per 100 delivered at Lucknow against Rs. 1-11-0 per 100 from Naini Tal. Different systems of cultivation were tried, with the outcome that a level surface with tan mulching gave the best results. The competitive trials will be continued every season for some few years.

17. I cannot find in the reports of present or past years that any foreign fruits, other than the abovementioned, have been introduced in the gardens, but if my list be imperfect, Mr. Ridley must complete it next year.

18 The following fruit trees were received from Dr. Bonavia during the year :—

Two Nepal limes.
Three varieties of vines.
From Lahore, six varieties of vines.
Two nectarines.
Eight varieties of pears (the introduction of which is, I suspect, hardly desirable).
Twenty-five pithecolobium.
Saman or West Indian rain-trees.

19. *(c) Distribution of plants.*—The number of fruit trees sent out was 748, of which 95 were distributed gratis, and nearly all the rest at half price to public gardens. I hope distribution will be more extensive in future years, as it becomes known at what low rates plants are obtainable A detailed statement should be given in future reports of the number of each tree distributed to the public in the same form as that given for distribution to public gardens.

II.—Vegetable and field crops.

II.—Vegetable and field crops (a)—Autumn season Maize.

20. *Improvement of indigenous or acclimatized kinds.*—Prize maize seed from the Bulandshahr Agricultural Show gave better heads than Indian-corn of the locality. Mr. Ridley has been directed to continue selecting seeds, and to form a pedigree stock of this and of the Jaunpur variety, which latter is the best in the province.

Vegetables.

21. In this class of culture (vegetables) Mr. Ridley has, from the beginning, done very good work, having carried on the original experiments instituted by Dr. Bonavia with the greatest patience and intelligence. More than one kind of acclimatized variety has been established, which is found to have accommodated itself to the climate better than imported classes. Mr. Ridley has previously given some accounts of the success obtained with certain varieties of the Brassica tribe, especially cauliflower, but no detail is given in this year's report. In next year's report a short list should be given of improved seeds, with an explanation of the special quality in which they are superior to imported kinds.

Carrots.

He has noticed a new experiment this year with Belgian carrots, of which he hopes he has raised acclimatized seed with some success. This is satisfactory, and Government, from my special report on the carrot crops of 1877, and the wonderful assistance provided by carrots against famine, has been made aware how great an importance I attach to the improvement and extension of carrot cultivation in these provinces, and will,

trust, support me in commending Mr. Ridley to spare no efforts in his attention to this vegetable, as well as to turnips, of which the utility as a food supply, under a failure of grain crops, is perhaps as great as that of carrots. One of the main experiments tried this year was the effect of early sowing of various kinds of vegetables under shelter from rain, but with no success. The experiment will be continued, as similar attempts have been proved to succeed elsewhere. II.—Vegetable and field crops.

22. *Distribution.*—Mr. Ridley has met with great success in the sale of vegetable seeds, but chiefly to Europeans. He has now been asked to distribute to natives in the vicinity of Lucknow, as a commencement in making these acclimatized seeds known to the agricultural population

23. The introduction of no new kinds of vegetables are specially mentioned. Mr. Ridley has been instructed to give more attention to the classes of vegetables which have been found to succeed in the warmer districts of the United States, and which have received such a rapid development there within the last few years. Gourds and tomatoes are prominent examples.

24. I have to thank Mr. Ridley for a very careful competitive trial made by him with a very large number of varieties of vegetable seeds raised for sale at Saháranpur ; the results of which were communicated to the Superintendent of the Saháranpur Botanical Gardens, and showed that much improvement was required in certain classes.

25. *Introduction of new kinds.*—Bahmia cotton, earth nut, Reana luxurians and some foreign wheats were sown experimentally with no result worth record, except that the only trial which can be called successful was that with Reana luxurians, grown for a seed-supply with the same success as at Cawnpore and Saháranpur, giving another indication of the promising character of this fodder plant. Reana luxurians.

26. A crop of seed of Egyptian horse beans has been raised by Mr. Ridley, and recommended as superior to native kinds. This is the Bakla bean recommended by Dr. Bonavia in former reports. It will, in future years, be taken out to Court of Wards' estates for trial and introduction to natives. Horse beans.

III.—Flower culture.

27. (*a*) *Improvement of indigenous or acclimatized kinds.* Persevering efforts have long been made by Dr. Bonavia and Mr. Ridley to acclimatize English flower seeds, with a view to obtain earlier as well as more secure germination. Results have been exceedingly good in certain classes (*e. g.*, phlox, pansies, &c.,) of which a detailed list should be given by Mr. Ridley in his next report. III.—Flower culture. (*a*) Improvement of indigenous or acclimatized kinds.

28. (*b*) *Introduction of new kinds.*—None are specially mentioned. (*b*) Introduction of new kinds

29. (*c*) *Distribution* is satisfactory. The seeds have acquired such a reputation that very large numbers (as shown in the appendix) have been sold. It is satisfactory to find that such institutions as the Agri-Horticultural Society of India, and of the Central Provinces, indent largely on Lucknow for supplies. The fact of the fast-increasing confidence (*c*) Distribution.

placed in the Lucknow seeds is the best reward which could be given to the persevering and long-continued efforts made by Dr. Bonavia and Mr. Ridley in this direction.

IV.—Arboriculture. Establishment of a nursery.

IV.—Arboriculture.

30. There is not so much to say under this head this year as there will be in future years, since steps were taken at the close of the year under report to obtain a new area of land for arboricultural nurseries. An account of this new arrangement must be reserved for next year's report. It is necessary, however, to state that during the current year it was determined, under the orders of Government, to make Lucknow one of the arboricultural centres in connection with the scheme propounded by the Inspector-General of Forests, of which the principle is that new and exotic trees should not be unreservedly committed to the care (or carelessness) of amateurs, but placed for some years, under professional superintendence. The trial of new trees under the charge of the Forest Department only is not sufficient, since our forests all lie in a region which possesses an exceptional climate, being situated either upon or closely underneath the Himálayas. Lucknow has, therefore, been chosen as one of the outlying localities at which arboricultural operations are to be tried.

(*a*) Improvement of indigenous or acclimatized kinds.

31. (*a*) *Improvement of indigenous or acclimatized kinds.*—No operations are recorded.

(*b*) Introduction of new kinds.

32. (*b*) *Introduction of new kinds.*—Eucalypti of different varieties continue to be raised. The following kinds have succeeded best :—

Eucalyptus rostrata.
Saligna : syn. resinifera.
Citriodora.

33. I do not myself look forward to a great future for the eucalyptus in India. It is a very exhausting tree and cannot be grown near fields, while it is useless for avenues. It may, however, turn out, as a rapid grower, to be a useful fuel producer. No other foreign tree, other than fruit trees already mentioned, is noticed in Mr. Ridley's report.

(*c*) Distribution of seeds and plants for arboricultural purposes.

34. (*c*) *Distribution.*—This is imperfectly shown: and I take this opportunity of observing that too little distinction is made in the report under each head. In treating of sale and distribution statistics, for flowers, ornamental plants, and fruit trees, vegetables and arboriculture are collected together in such a way that a complete account of the results under each head is impossible. The Superintendent has now been instructed to record all statistics, financial or otherwise, under each separate section in all future reports.

V.—Financial results.

V.—Financial results.

35. These are very successful, when it is considered that the Superintendent has been required to effect cheaper distribution than formerly to public gardens.

36. The jail gardens seem to require seeds and plants gratis, but this arrangement does not seem fair to either department, and the Inspector-General of Prisons has been asked to require an entry of debit and credit to be made in the accounts of both, at the reduced charges allowed to public gardens.

V.—Financial results.

The following table shows the comparative receipts and expenditure of the last three years :—

Year.	Excluding sale of acclimatized seeds.	Sale of acclimatized seeds.	Expenditure.
	Rs. a. p.	Rs. a. p.	Rs. a. p.
1867-77 ...	6,504 11 6	401 14 0	8,547 15 8
1877-78 ...	6,053 12 4	906 10 6	8,700 11 9
1878-79 ...	7,610 1 5	1,291 5 4	10,778 12 2

28. In conclusion, I append those portions of Mr. Ridley's half-yearly reports which are of special interest to the public, in accordance with the desire of the Government of India, for publication, if required, in the *Government Gazette*.

E. C. BUCK,
Dir., Dep. of Agri. and Commerce,
N.-W. P. and Oudh.

REPORT

ON THE

HORTICULTURAL GARDEN OF LUCKNOW

FOR THE

Year ending 31st March, 1879.

Budget.

THE total estimated receipts for 1878-79 amounted to Rs. 9,603-0-0. The total actual receipts for the same year amounted to Rs. 12,801-6-5, showing a surplus of Rs. 3,198-6-5.

The total estimated expenditure for the year amounted to Rs. 9,603-0-0, and the total actual expenditure was Rs. 10,778-12-2, or Rs. 1,175-12-2 over the estimate.

Government grant.

2. Of the Government grant of Rs. 4,000 only Rs. 3,695-0-0 were drawn.

3. There was no difference in the interest on Government notes.

Details of increase or decrease over budget estimate.

The receipts from lease of land were more by Rs. 58-2-3.

The receipts from 1st and 2nd class subscribers were more by Rs. 24-0-0.

The sale of plants was more by Rs. 1,334-10-0; of this amount Rs. 253-4-0 was realized by sale of strawberry plants.

The sale of fruit was more by Rs. 231-2-3.

The sale of flowers was more by Rs. 63-0-9.

The sale of imported seeds was more by Rs. 146-11-0.

The sale of acclimatized seeds was more by Rs. 891-5-0.

The sale of wood was less by Rs. 10-7-0.

The sale of catalogues was Rs. 0-12-0, or less by Rs. 14-4-0; the 12 annas was due from last year. During the year under report catalogues have been distributed gratis, hence the falling off under this head.

The receipts on account of carriage and packing charges, &c., were more by Rs. 505-4-11.

The receipts on account of miscellaneous things were more by Rs. 40-15-3.

Increase of receipts over last year.

4. The total receipts from all sources for the year under report show an increase over those of last year of Rs. 3,072-2-2.

The total receipt from sale of garden produce, such as fruit, flowers, plants, acclimatized seeds, &c., amounts to Rs. 5,679-9-0, showing an increase of Rs. 1,616-11-0 over the amount realized for the same last year.

In the sale of plants there is an increase of Rs. 1,162-5-9 over last year; of this, Rs. 253-4-0 was sale of strawberry plants. After deducting this amount, however, the increase is still considerable, this is very satisfactory, more so, considering that a falling off was reported last year.

The receipts by sale of acclimatized seeds likewise show a satisfactory increase, being Rs. 384-10-6 over last year.

There is also a slight increase in all the other items of garden produce, except flowers, for which there is a slight decrease.

Net savings on budget estimate.

Deducting the excess expenditure, Rs. 1,175-12-2, from the surplus saving, Rs. 3,198-6-5, leaves a balance of Rs. 2,022-10-3 in favor of the hort. garden, which is nearly two-thirds of the Government grant.

A detailed statement of receipts and expenditure is attached to this report.

Accounted with seedsmen.

6. Messrs. Landreth and Sons, Philadelphia, balance in favor of Landreth and Sons ... ... Dols. 204 33 0
Remitted in 1878-79 ... ... „ 208 53 0

Balance in favor of hort. garden ... ... „ 4 20 0
Messrs Sutton and Sons, London, remitted in 1878-79 for seeds ... £ 20 0 0
Their bill for seeds ... ... £ 17 17 6
Balance in favor of hort. garden ... ... £ 2 2 6

Subscribers.

7. The number of subscribers during the past year were :—

First class	19
Second class	9

Plants sold.

8. The number of plants sold were :—

Ornamental plants of sorts	3,623
Rose plants	910
Fruit trees	653
Cuttings of sorts	955

Plants supplied gratis.

Ornamental plants of sorts	2,408
Rose plants	59
Fruit trees	95
Cuttings of sorts	50

9. The total value of these at ordinary rates is Rs. 700-0-0.

Fruit trees supplied at half-price.

10. With reference to the request conveyed in your No. $\frac{541T.}{XC.-1A}$, dated 14th August, 1878, it was decided to supply municipal and public gardens with fruit trees at half-price: under this arrangement the following were sent out :—

Mangoes	261
Pumelows	8
Oranges	301
Vines	33
Malta Lemons	44
Loquets	11
Peaches	4

The value of the above at half-rates amounts to Rs. 149-5-0, by which amount the receipts from sale of plants would have been greater had full rates been charged. It is, however, quite probable that indents would have been smaller at full rates, and the actual receipts no greater after all.

On the whole, I look upon the half-price arrangement as a good one, and hope it may be permanently substituted in place of the one allowing such gardens to have plants free of charge, especially fruit trees, which require a good deal of labor and skill to produce ; and, unlike trees and plants of an ornamental character, they ultimately yield not merely valuable, but profitable, crops; a moderate charge for such is, therefore, only reasonable.

Cultivation of fruit trees. Profit and loss.

11. In order to ascertain the profit arising from the cultivation of various kinds of orchard fruit, I commenced on the 1st of April, 1878, to keep an account of the expenses incurred in cultivating each kind grown in the garden ; these, with the price obtained for each crop, are given in the table below.

The figures of course prove little or nothing, and are not put forward as showing what may be gained in a regular way ; that can only be arrived at by taking the average over a number of years, say 15 or 20, or even more.

Table showing the expenditure and receipts per acre attending the cultivation of several orchard fruits :—

Name of fruit.	Cost per acre.	Value realized per acre.	Profit per acre.	Loss per acre.
	Rs. a. p.	Rs. a. p.	Rs. a. p	Rs. a. p
Peaches	95 1 6	126 9 3	31 7 9	...
Vines	88 7 6	602 2 3	513 10 9	...
Alubokharas	24 14 0	54 10 3	29 12 3	...
Pummelows	27 1 0	122 0 6	94 15 6	...
Maltia emons	38 8 9	50 10 9	12 2 0	...
Mangoes and Pineapples	26 6 3	32 5 3	5 15 0	...
Leechees	30 4 6	0 15 9	...	29 4 9
Malta oranges	32 7 0	67 9 6	35 2 6	...
Cintra oranges	34 10 3	109 15 0	75 4 9	...
Mandarin oranges	42 4 9	62 14 6	20 9 9	...

12. This is still in a very unsatisfactory condition, which will be understood when I state that only a few of the vines have fruited this year; this may be a common occurrence, but none the less undesirable on that account, and, until a better method and different treatment have been tried, I shall not be satisfied that better and regular crops cannot be obtained. Old vinery.

The effect of root-pruning referred to last year, has had only the effect of greatly weakening the growth: neither of the two vines operated on bore any fruit this year; it remains to be seen if any improvement will yet take place, which is possible with a better season.

Owing to the scanty crop, I have been unable to carry out your suggestion to try some of the vines under cover; no results which could afterwards be spoken about would have been realized by covering up two or three bunches: this experiment must therefore stand over till next year.

13. The plants in the new vinery have not made much progress during the year, and very few fruited; a longer trial is of course necessary before a correct opinion can be formed as to the merits or demerits of this system. New vinery.

14. All the kinds in the garden fruited more or less during the year. The kind called Malta bore by far the heaviest crop, and, on the whole, I look upon its introduction as a great success; unfortunately, the trees have suffered greatly during the two past dry seasons, and their general appearance is anything but pleasing, and calculated to give the idea that they are a failure and not likely to do well in this climate. I do not think, however, that this is likely to be the case, given good soil and healthy plants to begin with. A good deal of the unthrifty appearance of the plants in the hort. garden may be put down to the bad soil in which they are growing, and the rest to bad seasons, and in some degree, I think, to being worked on an unsuitable stock. It appears to be too strong-growing for the common sour lime. Dr. Bonavia has suggested the Seville as likely to prove a suitable stock. Seeds of this have been sown for stock, which will be tried in due time. Oranges. Malta.

I have previously stated that the trees bear well; in addition, the fruit is large and well-flavoured when thoroughly ripe; it can, however, be eaten before it is ripe, and is gathered and sent to the market, where it finds considerable favor when quite green; in this state it can be sent to market early in September, a season when fruit is scarce and before other oranges have come in.

Plants have been sent out from the garden for some years, but I have no information as to how they have succeeded. I regard it as a most desirable kind to plant, and, with good treatment, have no doubt it will give satisfactory results.

When fruit trees get diseased and sickly, pruning away the affected growth back to the healthy stems is often found effectual in restoring them to a healthy condition again. I therefore had all the unhealthy Malta and Mandarin orange trees treated in this way in January.

15. The opinion of a gentleman from Calcutta, who is a keen horticulturist, and well acquainted with the fruit of the true kind, as imported into the Calcutta market, is, that the kind we have in the garden is the true Sylhet orange; this opinion was given after testing some of the ripe fruit produced in the garden and carefully noticing other points, as size, shape, rind, &c. This being so, there is no necessity of importing trees from Sylhet, as suggested last year. Sylhet.

As yet the trees have not yielded well, but they may improve in that respect as they get older.

16. The two kinds from Nagpur resemble the last named a good deal, and are, I think, the same variety, only slightly altered through having been cultivated for some years in a different climate and soil. Nagpur, large. Nagpur, small.

Santra.

17. This kind seems closely related to both the above, and it is quite probable that all four were originally the same variety, and that cultivation in different soils and climates has brought about slight alterations in the fruit and growth of the trees.

Experiments with different stocks.

18. Before leaving the garden Dr. Bonavia thought to try different kinds of oranges on the pummelow stock, and accordingly had a few of each kind budded. They were planted out in prepared sites in March, 1878, as follows :—

Sylhet	4
Cintra	1
Kewla	2
Malta	2
Nagpur, large	3
Nagpur, small	1
Malta lemon...	2
Pummelow	1

The results will be watched and duly reported ; as yet the plants are doing well.

This year I hope to try the Seville and Malta lemon as stocks.

Hybridising.

19. The Kewla is the hardiest, or at least does best in this climate, but the fruit lacks flavour, especially sweetness ; the other kinds have flavour, but lack constitution ; a cross or hybrid, sharing the qualities of both these kinds, would be a most valuable acquisition. To this end I fertilized a number of flowers of the Malta with pollen from the Kewla, and *vice versâ*, but unfortunately only one of the blossoms operated and formed fruit, and that on a Kewla tree. It remains to be seen whether or not the fruit will come to perfection and yield seed.

Mangoes.

20. The mango trees are in a healthy flourishing condition and bearing an unusually heavy crop. A kind named Bhadania calls for some notice, as a distinct and late variety : last year the fruit was not gathered till the end of September, and might have been left a week or two longer, as it was not then thoroughly ripe. The fruit belonged, by purchase, to a contractor, who, of course, gathered it as soon as possible to save cost of herding. This year I have reserved one of the trees to ascertain how late the fruit will keep. Four new kinds were received from the public garden, Benares, named Chakchakiá, Kaisapati, Davis and Vizianagram.

Eucalypti.

21. The experiment mentioned in the Eucalypti half-yearly report ending November 30th, 1878, of cutting over part of the trees in the old plantation, has proved almost a failure ; a considerable number of the stools died after making a little growth, and very few are now alive. I attribute failure to the cutting over having been done at a wrong season.

In the other plantation of E. rostrata, made in 1876, several trees have died ; as this has happened chiefly in one spot, I take the soil to be at fault. It appears that part of the plot was formerly a tank, which was filled up, and it is quite possible that the soil used for replacing this contained manure or other matter unsuited to Eucalyptus. I cannot attribute the cause to heat alone, as there is not a dead tree in other parts of the plantation.

There is no indication of disease or injury from insects observable ; on examination, the stem, branches and roots were found intact. Any occurrence of this kind calls for notice, especially now this species is being distributed and planted ; as great disappointment would result should it be found that, after growing three or four years, the trees succumbed to the climate. I do not think, however, there is any likelihood of this being the case, as it seems perfectly hardy and well-suited to the Indian climate. Evidence of this is shown in the experiment mentioned in last year's report, of planting in poor soil. The plants were put out in July, 1877, (the year of drought), and received on occasional hand-watering till last rains, none since ; the ground is uneven, on the low portion the best trees are now 18 feet high and quite healthy ; on the higher

portion, 10 to 12 feet high, also healthy ; some of the trees are small, only 2 feet high, but have come through the hot weather without irrigation. The other two species planted on the same plot, *viz.*, E. sideroxylon and cornuta, are all dead.

The plot of E. saligna (resenifera) planted out in September, 1877, is doing splendidly, the best trees are from 18 to 20 feet high, stems straight and well furnished with twigs down to the ground. This species is quite as hardy as rostrata, but does not run up in heig ht so fast.

A small block of E. citriodora, planted on the same date as the last, is also doing well. Several trees are from 15 to 18 feet high, and quite healthy. A characteristic of this species is its highly-scented foliage, the outer bark, too, is slightly scented ; the latter falls off in large pieces, and finding it scented, I thought it might possibly contain medicinal or other properties of value. I therefore sent a small quantity to the Secretary, Agri Horticultural Society of India, for analysis ; it was submitted to physiological and chemical tests, but no special property of value was detected.

The only other kinds which promise to do well are E. paniculata (white iron bark) and E. polyanthemos ; there are several other kinds in the garden, but they call for no special notice.

22. The carob trees give a fairly good yield of pods every year, the pods were not weighed last year, but the seed when separated from the pods weighed 98 ℔. Carob trees.

This year's crop from 14 trees (about the average number) weighed immediately after gathering 4 maunds 20 seers, after drying and seperating, the seed weighed 37 seers and the dry matter 54 seers, showing a loss by waste and drying of one-half the weight. The pods are so hard and tough that they have to be completely broken up with a stone or mallet to get the seeds out, this causes great waste in the dry matter, which flies about in every direction and cannot easily be collected again.

Of last year's seed 67½ ℔ were distributed gratis and 11 ℔ sold ; a large quantity was sown in the garden, and 10 ℔ still remain on hand.

Although the trees in the hort. garden are healthy and yield well, the climate is decidedly unfavorable to the proper development of the pods, which seem to get checked by the hot winds in May ; when they are growing and swelling, they appear to ripen and shrivel up prematurely, and never obtain the size and substance of those produced in Europe : perhaps it may be wrong to attribute this inferiority wholly to climate, as there may be different kinds of carob. This is quite probable, as it has been cultivated for some time in Europe, where efforts have no doubt been made to secure improved varieties ; I would therefore beg to suggest that plants of the best known kinds be imported and distributed to places where they are likely to succeed.

I would also suggest that some of the kind we already have be tried in the hills, if not already done. Through planters and others it could perhaps be tried at different altitudes. I believe it is quite hardy and will stand a considerable amount of frost.

Budding and grafting (inarching) are both being tried as methods of propagation.

23. The instructions conveyed in your No. $\frac{489T.}{A.}$, dated August 5th, 1878, regarding a vegetable garden, have been carried out : a piece of land in the garden was set aside for the purpose, and a small quantity of most kinds of cold weather vegetables were cultivated ; the beginning of the season was very unfavorable to most kinds, but later nearly all did well. By making successional sowings a supply of cauliflowers, cabbages and Brussels sprouts was kept up till June. They were of course very small, but usable. Vegetable garden.

A separate report on the trials made with Saháranpur seeds has already been sent in, and need not be recapitulated here.

The object of the vegetable garden is to enable the apprentice boys to gain a knowledge of vegetable growing, according to the best known methods. On no other

grounds is it desirable to cultivate vegetables in the horticultural garden ; it does not pay to do so merely for supplying dallies.

Country vegetables.

24. A small patch of the principal kinds of country vegetables was put down, partly for the purpose of obtaining a supply of true seed for which applications are frequently received, but chiefly to ascertain if any of them can be improved by good cultivation and selection. Sowings have been made again this year and will, I hope, be continued, as the object in view is well worth attention.

Acclimatized seeds.

25. Acclimatized seed of the following vegetables has proved, after several years' trial, very satisfactory :—

Cauliflower, early and late.
Lettuce Cos.
Onion, silver skin.
Tomato, three kinds.

Salsify is not quite satisfactory ; crops raised from garden seed very quickly run to flower and consequently produce inferior roots. The acclimatized cauliflower seed is a great success, there is a good demand for it. A seedsman in Bombay takes a considerable quantity every year, chiefly, I understand, for sale to native growers. There are two kinds, *viz.*, early and late. A quantity of the late kind was grown this year for seed, the plants for which were raised from seed harvested in March, 1874, or four years old, the results were most satisfactory ; the plants were of medium size, with large compact heads, very superior to any I had previously seen from acclimatized seed ; this is an interesting fact in support of the theory that old seed gives the best produce.

Acclimatized flower seeds.

26. Judging from the demand there is for them, the acclimatized flower seeds appear to gain in public favor. This year's sales were unprecedented. The chief purchasers were the Agri-Horticultural Society of India, Agri-Horticultural Society of the Central Provinces, and Superintendent, Government Garden, Bangalore.

A very large area of ground is required for the production of those seeds, and now that a vegetable garden has been added and country vegetables raised, no space is available for agricultural crops, except on the most limited scale.

I therefore take the opportunity of proposing that all agricultural experiments be discontinued here, as all available space is wanted for garden operations and crops and nurseries.

Plant-houses.

27. The roof of the second plant-house, which had got completely out of repair, has been replaced with a new one ; entirely new material has been used, the cross beams are sál, over which a nailed bamboo trellis is laid, covered with palm leaves. This arrangement dispenses with chicks. All the other houses are in good repair.

What is most wanted now, is a propagating pit, covered with glass and provided with an apparatus for supplying bottom heat. A structure of this kind would be of very great service, and need not be large. At present very little progress can be made in increasing rare and ornamental plants ; as a rule, a favorable season has to be waited for, and so, in some instances, it takes years to get up a stock of a desirable plant.

With seeds it often happens that collections from tropical countries have to be kept for weeks and even months, till there is sufficient warmth to cause them to germinate, and which, in the meantime, lose their vitality and become worthless.

Cabul Donkeys.

28. For the purpose of mule breeding a pair of Cabul donkeys were purchased in 1875 ; they were kept in the garden for a year and afterwards made over to Mr. Mumford of Rae Bareli, who very kindly took, and still keeps, charge of them. The cost of keeping them, *i. e.*, gram and wages of a syce, is met out of the garden funds.

Mr. Mumford states that he has saved the two fillies foaled since being in his charge.

Several horse mares have also been served every year, but it appears the owners do not reside in the district, and beyond three which succeeded, the results are not known. This is to be regretted, as no idea can be formed of what progress has been made.

School of Horticulture.

29. From the beginning of the financial year (April 1st) five more boys were entertained, making the total number 10; subsequently six more were taken on, as requested in your No. $\frac{654}{CCLXXXA.}$, dated 3rd September, 1878, making the total number 16, which is the strength of the present establishment. One of the boys last entertained was dismissed in March, his faults were idleness and inattention to his duties; another boy has been taken in his place.

The boys who have been longest in the garden have made fair progress and show an interest in their work and seem anxious to learn; little can be said yet about those last employed, more than that they are making satisfactory progress.

Horticultural show.

30. The annual horticultural show was held on the 8th of March, and was a success. The exhibits in all classes, except fruit, were good, and in quality quite up to the average of preceeding years; in number and size nearly all showed an increase.

The accounts of the show are as follows:—

Receipts :—

	Rs.	a.	p.
Balance from last year	245	6	8
Contributed by European and native gentlemen	137	0	0
Contributed by Municipality of Lucknow	50	0	0
Sale of tickets	61	12	0
Total ...	494	2	8

Expenditure :—

	Rs.	a.	p.
Distributed in prizes	205	0	0
Printing schedules and tickets	13	0	0
Repairs to plant-stands	15	9	6
Miscellaneous expenses	8	10	9
Balance with Deputy Commissioner	251	14	5
Total ...	494	2	8

Tobacco.

31. A small quantity of the following tobaccos was grown for seed:—

Havannah.
Munro.
Manilla.

Ladák and a kind named microphylla gigantea, atropurpurea, the seed of which was bought from Messrs. Barr and Sugden: the leaves grow to a very large size and it might be worth trying on the tobacco farm.

The kind from Ladák is a most inferior variety, at least so far as size of leaf and yield goes. If some of the better known kinds would stand the climate, their introduction into Kashgar would surely prove highly acceptable.

Full details of experiments and other work done during the year under report have already been given in the two half-yearly and other special reports previously sent in.

Places to which plants, &c., were sent out.

32. The following are the various places to which plants, &c., were sent out in 1878-79:—

Aligarh, Azamgarh, Arrah, Ajmere, Allahabad, Agra, Bareilly, Bhartna, Basti, Benares, Birdpur, Banda, Bombay, Budaon, Bulandshahr, Buxar, Bangalore, Bassim, Barharwah, Cawnpore, Calcutta, Chunar, Chankari, Darbhángah, Deoli, Doranda, Etah, Etawah, Fatehpur, Fatehgarh, Ghazipur, Gorakhpur, Giridi,

Gwalior, Gúna, Hissar, Indore, Jhelum, Jaipur, Jounpore, Jabalpur, Jitwarpur, Jalna, Jacobábad, Jhánsi, Khagaoul, Kampti, Kurseong, Karnál, Kushtia, Ludhiana, Lahore, Moradabad, Mirzapur, Manjaul, Multan, Mussoorie, Morar, Mian-Mir, Madras, Muzaffarnagar, Nahan, Nagpur, Nowgong, Nassirabad, Naini Tal, Ottur, Orai, Partabpur, Purlah-kimedy, Patiala, Phillour, Pirakpur, Rúrki, Radhan, Ratasia, Rawalpindi, Ranikhet, Simla, Saugor, Sahárunpur, Sirmur, Sháhjahánpur, Sambhar Lake, Sara, Toondla, Umritsar, Ulwar, besides several stations in Oudh.

Seeds distributed gratis.

33. To the Deputy Conservator of Forests, Kheri—

10 kinds eucalyptus seed.

To Collector of Sháhjahánpur—

12 seers carob seed.

To Colonel Lowther, Benares—

A collection of flower seeds.

To Superintendent, Jail, Kheri—

1lb inga dulcis,
½lb carob,
1lb Bhamia cotton,
1 packet eucalyptus saligna.

To Superintendent, Government Farm, Allahabad—

1 seer inga dulcis.

To Director, Department, Agriculture and Commerce, North-Western Provinces and Oudh—

1lb carob seed.
A collection of native vegetable seeds and roots.

To Dr. Bonavia, Fyzabad—

2 packets flower seeds.

To Mr. Macdonald of Partabpur—

1lb inga dulcis.

To Major Farrer, Bassim, Hyderabad Assigned Districts—

1lb inga dulcis.

To Captain Hamilton, Allahabad—

1 packet carob,
1 packet inga dulcis.

To Deputy Commissioner, Bahraich—

1 packet inga dulcis.

To Collector of Farukhabad—

1lb inga dulcis.

To Collector of Gorakhpur—

3 seers inga dulcis.

To Secretary, Municipal Committee, Fatehgarh—

½lb inga dulcis.

Government House, Naini Tal—

A collection of flower seeds.

To the Secretary, Agri.-Horticultural Society, Calcutta—

1 packet Ladák tobacco.

To Superintendent, Botanical Garden, Calcutta—

1 packet Ladák tabacco,
A collection of flower seeds.

To Superintendent, Botanical Gardens, Grahams town, South Africa—

A collection of native vegetable seeds.

To Superintendent, Victoria Gardens, Bombay—

A collection of flower seeds.

To J. Beck, Esq., Cashmere—

1 packet carob,
1 packet inga dulcis,
2 packets vegetable seeds,
1 packet flower seeds,
1lb. Australian wheat,
1 packet reana luxurians,
1 packet Australian grass,
1 packet bakla.

To Superintendent, Government Gardens, Bangalore—

1 packet inga dulcis,
9 packets tree seed,
1 packet Ladák tabacco.

* *To Deputy Commissioner, Hardoi—*
1 seer carob seed,
1 packet E. saligna.
To Personal Assistant to Commissioner, Inland Customs, Agra—
5 seers carob seeds.
To Superintendent, Government Farm, Cawnpore—
14 seers carob seeds.

34. The following seeds have been received during the year :— **Seeds received.**

From Baron Von Mueller, Melbourne—
Araucaria Bidwelti,
From Mr. Beck, Cashmere—
Platanus orientalis,
Pinus excelsa,
Cedrus deodara,
Ladák tobacco,
and four packets of conifer seeds.
From Colonel Lowther, Benares,—
Ipomoea aculata,
Passiflora minima,
Passiflora fœtida,
Crotolaria grandiflora,
Crotolaria speciosa,
Reana luxurians,
and a collection of annual seeds of sorts, and a parcel of bulbs.
From the Superintendent, Botanical Garden, Calcutta,—
Cananga odorata,
Terminalia chebula,
Jacquinia ruscifolia,
Naucha cadamba,
Dalbergia lanceolaria,
and a parcel mahogany seeds.
From the Superintendent, Botanical Garden, Saháranpur—
Pithecolobium saman,
Cupressus funebris,
Cupressus tomlosa,
Cupressus sempervirens,
Seven kinds of cotton seeds,
2 collections of vegetable seeds.
From Dr. Bonavia, Fyzabad—
Mango seeds from a small kind, of excellent flavor,
From the Director, Department, Agriculture and Commerce, N.-W. Provinces and Oudh—
Reana luxurians,
5 packets of Ipomoea.
From Mr J. H. Prinsep, Cawnpore—
Cupressus funebris.
From Mr. Barrie, Lucknow—
Dolichos loblob,
Abroma umbellata.
From Mr. H. A. Felton Smith, Bahraich—
2 kinds of Egyptian melons.
From Mr. Mumford, Rae Bareli—
Roxburghia cathartica,
Combretum sp,
Caryota urens,
Parkinsonia aculeata,
Barassus flabelliformis,
3 kinds of bamboo,
5 of Indian-corn,
and 11 other packets of seeds of sorts.

By purchase.

From Mr. Cresswell, Melbourne—
2lb of eucalyptus rostrata seed.

35. *From Mr. Pirie, Lucknow—*
2 Hydrangeas,
1 Gesneria. **Plants received.**
From Superintendent, Botanical Garden, Calcutta—
A collection of plants.

From Superintendent, Botanical Garden, Saharanpur—
25 plants of pithecolobuim saman,
42 fruit trees of sorts.

From Major Swetenham, Indore—
2 collections of rose cuttings.

From Mr. R. Peel, Lucknow—
A bundle of geranium cuttings.

From Mr. J. C. Lowsey, Lucknow—
A basket of ferns and orchids.

From Superintendent, Botanical Garden, Natal—
A cask of cycods and bulbs.

From Superintendent, Government Gardens, Lahore—
6 vines of sorts,
2 nectarine, 2 kinds,
8 pears of sorts.

From Dr. Bonavia, Fyzabad—
2 Nepal limes,
2 trifoliate vines,
1 creeping vine.

From Dr. Cunningham, Simla—
14 kinds of rose cuttings.

By purchase, from Messrs. W. Paul and Son, London—
A box of roses.

J. W. RIDLEY,
Supdt., Hort. Garden, Lucknow.

Abstract of the Horticultural Garden Accounts for 1878-79, *commencing from* 1*st April*, 1878, *to* 31*st March*, 1879.

No.	Receipts.	Amount.	Total.	No.	Disbursements.	Amount.	Total.
		Rs. a. p.	Rs. a. p.			Rs. a. p.	Rs. a. p.
1	Interest on Government Notes	108 0 0		1	Purchase of imported seeds	753 7 6	
2	Lease of land	308 2 3		2	Freight on imported seeds and plants	56 8 10	
3	Subscription, 1st class	288 0 0		3	Landing charges on plants	4 14 0	
4	Ditto 2nd class	144 0 0		4	Superintendent, Hort. Garden for 12 months	1,500 0 0	
5	Sale of plants	2,934 10 0		5	Garden clerk	300 0 0	
6	Do. of fruit	1,231 2 3		6	Office peon	60 0 0	
7	Do. of flowers	213 0 9		7	Pay of permanent establishment, Hort. Garden	1,835 0 0	
8	Do. of acclimatized seeds	1,291 5 0		8	Pay of temporary establishment	1,102 10 3	
9	Do. of wood	9 7 0		9	Food of bullocks	1,392 13 9	
10	Do. of imported seeds	1,346 11 0		10	Cost of 2 pucka bullock runs for wells	132 6 3	
11	Do. of old and unserviceable bullocks	...		11	Carriage and packing on plants and seeds	859 4 3	
12	Do. of catalogues	0 12 0		12	Construction of plant-house and repairs	137 14 0	
13	Receipt on account of carriage and packing charges on plants and seeds sent out.	905 4 11		13	Trellis-work and poles for plants	18 3 6	
14	Miscellaneous	120 15 3	8,901 6 5	14	Purchase of plants and seeds...	621 14 11	
				15	Ditto of earthen pots	185 7 9	
				16	Ditto of manure	60 2 0	
	Provincial ...	...	3,900 0 0	17	Ditto of implements and leather buckets	212 5 6	
				18	Ditto of bullocks	...	
			12,801 6 5	19	Ditto of books	60 7 5	
	Saving ...	...	2,022 10 3	20	Refund to purchasers on account of advance	23 7 0	
				21	Construction of water channels	31 1 9	
	Expenditure grant ...	...	10,778 11 2	22	Printing and advertizing charges	129 7 0	
				23	Postage stamps used	114 6 0	
				24	Stationery	40 2 6	
				25	Repairs to old carts and making new ones	64 1 6	
				26	Making and repairing road	69 4 9	
				27	Repairs to old potting shed	68 2 0	
				28	Contingent expenses	123 3 9	
				29	School of native malis (young natives taught as gardeners) ...	299 14 6	
				30	Iron arches for rose walk	522 1 6	
							10,778 12 2
					Balance in Treasury ...	...	2,022 10 3
	Total ...	...	12,801 6 5		Total ...	...	12,801 6 5

LUCKNOW:
The 28th June, 1879.

J. W. RIDLEY,
Supdt, Hort. Garden, Lucknow.

APPENDIX I.

Half-yearly Report by Superintendent, Horticultural Garden, Lucknow.

Rhubarb.

The roots sent down by you from Naini Tal, I managed to divide into eight sets. Six were planted in the garden and two given to the máli at Dilkhusha.

A sheltered corner was selected and prepared by trenching and a liberal application of manure for the roots planted in the hort. garden; all seemed to take and at once commenced to grow. They did not, however, make much progress, owing, no doubt, to the falling temperature at that season. By the end of December, all growth ceased and the leaves produced died completely down. The plants remained in this state till the end of March, when they again pushed up leaves; only four however did so, the others having died; subsequently two more failed, and now only two are alive, and one of these making very little growth, the other however is growing vigorously.

I have on two occasions (May 8th and May 24th) gathered three and four good-sized stalks from it, the best was about 14 inches long and 8½ inches in circumference.

On the whole, the trial is very satisfactory, and I should very much like to continue the experiment another year on a more extensive scale. Present experience seems to show large strong roots to be best; weak ones have not time to establish themselves sufficiently to produce anything.

The máli who received the two roots abovementioned has managed to keep them alive, but they have made little growth and yielded nothing yet.

White Belgian carrot.

The efforts made to secure better acclimatized seed of this have been fairly successful; the crop raised from it was most decidedly superior to last year's, and the tendency to seed markedly less.

A small quantity was sown on the same plot with imported seed, the crop from acclimatized was earliest, but the size of the roots was nearly the same in both plots, there was a greater number of seed-bearing plants from the acclimatized seed.

Roots have again been selected from both crops and planted for producing seed, and next year I hope to test both with imported seed and ascertain the respective yield of each per acre.

The results obtained this year clearly prove that an excellent crop can be obtained from one-year acclimatized seed, a crop (so far as bulk is concerned) three or four times superior to what is ordinarily obtained from the indigenous variety, which, I have no doubt, it would largely replace once cultivators became acquainted with it.

Strawberrries.

As stated in the preceeding half-yearly report, the object of the experiments undertaken with strawberries was to ascertain the best place from which to procure plants, and also the best method of culture to practise. Plants were therefore procured from Naini Tal, Meerut and Dinapur, it was also intended to try Lucknow plants, but none were procurable. An equal number of plants from the three places abovementioned were planted on trenched and untrenched ground, 1,000 square feet were allotted to each; half of this space was made up in ridges, the other half into two flat beds; both on the ridges and beds the plants were planted the same distance apart, *viz.*, two feet between the lines and 18 inches between the plants. This arrangement gave 300 plants from each place on trenched and the same number on untrenched land. The ridges were six inches high. The trenched ground was worked two feet deep and liberally manured with cow-dung to that depth, the untrenched ground was merely dug over to an ordinary depth with a phaurá, the same kind of manure was applied, the quantity used on each plot was unfortunately not ascertained, but I may safely say quite double was given to the trenched plot and the cost of digging the latter was at least six or eight times more than the other.

As shown in the accompanying table, two out of the three plots gave a less yield on the trenched ground, only Dinapur plants in beds gave a large yield. The plants from which this was obtained were very large, and strong and thin roots had no doubt penetrated sooner into the enriched subsoil than the weaker plants on the other plots. I may add, no selection of the plants was made, and nothing done to favor them more than the rest, their better growth was quite natural.

The other plots all show that better results can be obtained from untrenched than trenched ground. With the above exception, however, it is impossible to pronounce in favor of either method, at least so far as yield is concerned, with regard to the greater cost of trenching there can be no question.

The results leave no doubt regarding the advantage of beds over ridges, it will be observed that the yield in all cases is greater from the former. The object of planting on ridges is to keep the fruit clean, but I did not observe any advantage even in that point over beds.

I find that by leaving the surface soil unstirred after the fruit began to ripen that very little was washed on to the fruit.

Clay collars were also tried for keeping the fruit clean, but were found of little or no use. A little tan spread round each plant answers infinitely better, and, besides keeping the fruit clean, serves as a mulching.

With regard to the merits of the plants, it will be seen that those from Naini Tal gave the most uniform yield in all plots. They were planted a fortnight before those from Dinapur, and commenced to yield a month earlier, but the largest yield was from the Dinapur plants, which also bore the largest fruit. The Meerut plants are nowhere.

The cost of each per hundred is as follow :—

					Rs.	a.	p.
Naini Tal 100	...	...	...	...	0	8	0
Carriage and freight	...	...	...	...	0	8	2
			Total	...	0	11	2
Meerut 100	...	...	...	...	0	9	6
Freight	...	...	...	...	1	1	8
			Total	...	1	11	2
Dinapore 100	...	...	...	...	1	2	0
Freight	...	...	...	...	1	2	0
			Total	...	2	4	0

Those figures show the hill plants to be much the cheapest : this, and the fact that they are earlier than the others, and give a uniform yield of fair-sized fruit, leads to the conclusion that the hills is the best quarter from which to procure stock for planting.

With certain modifications, it seems desirable to repeat these experiments another year. Trenching, pure and simple, I consider a mistake, unless the subsoil is fairly good. In the case of the horticultural garden, it simply means burying the rich surface and putting in its place a loamy sand, which is so poor that young strawberry plants have quite a struggle to keep alive till their roots reach the better soil below.

A better plan would be only to remove the surface soil, dig and loosen up the subsoil, incorporate manure with it, and then replace the surface soil, this would give the plants good soil to start in, and as the roots went deeper they would find the enriched subsoil. I have all along considered it improbable that the roots of strawberry plants would penetrate so deep as two feet in one season ; and looked upon trenching for them as useless : to settle my doubts on the matter, I had a trench opened a few days ago in the middle of each plot to ascertain the whereabouts of the roots. Dinapur trenched ; a few roots had penetrated 2½ feet, but the body of the roots were from four to six inches below the surface.

Dinapur untrenched ; roots quite as deep as in trenched ; surface roots like the other. Naini Tal and Meerut trenched and untrenched, were about the same, a few roots 1½ feet deep, the body of the roots as before. It is therefore quite clear that the best soil, and the greater portion of stimulants, should be near the surface.

Three beds on the English system were tried, but there was no apparent advantage over flat beds ; I mulched one bed with tan, and found it went twice as long without water as the other two.

The plants of President sent were planted on trenched ground, part on ridges and part on flat beds ; they were sent too early, a good many died, chiefly in the beds. I carefully examined the fruit at different times, but failed to detect any difference between it and that of the old kind ; there was no perceptible difference in the plants either.

I should have explained before that the light yield on the ridges is partly owing to a greater number of the plants having died than on the beds.

Buds of 3 kinds of the best sorts procurable here have been obtained and worked on seedling stocks. When established, they will be planted out and treated in different ways, with the object of effecting improvement in the size and flavour of the fruit. I have also procured seed of 5 kinds, which have been sown for the purpose of obtaining stocks. Bérs.